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**AQUATIC INVERTEBRATES AND HABITAT AT A FIXED
STATION ON THE TETON RIVER,
CHOTEAU COUNTY, MONTANA**

July 9, 2001

**A report to
the Montana Department of Environmental Quality
Helena, Montana**

**by
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INTRODUCTION

This report is one of 38 brief interpretive summaries of data assembled as part of a statewide, multi-year study conducted by the Montana Department of Environmental Quality (MT DEQ). Each report discusses information generated from a single benthic invertebrate sample collection and habitat evaluation at a fixed station established on a gauged river or high-order tributary. The present treatise focuses on the aquatic community sampled on the Teton River near Loma, Montana on August 7, 2001. The sample site was located by GPS reading at 47° 55' 53" N, 110° 30' 34" W, lying within the Northwestern Glaciated Plains Ecoregion (Woods et al. 1998). The sample was collected by personnel of MT DEQ. Sampling effort consisted of either a composite of four Hess samples, or a one-minute kicknet collection (Bukantis 1998). Habitat parameters were evaluated using the MT DEQ Macroinvertebrate Habitat Assessment Field Form for streams with glide/pool prevalence. Invertebrate samples were processed and animals identified by Rhithron Associates, Inc. Analysis of invertebrate assemblages was accomplished by applying the method recommended by Bukantis (1998) for streams of Montana's Plains ecoregions. The method uses a multimetric battery to evaluate disturbance to biotic integrity. Results from the application of other metric batteries may be found in the Appendix.

RESULTS AND DISCUSSION

Table 1 itemizes the evaluated habitat parameters and shows the assigned scores for each, as well as the integrated score and condition category.

Overall habitat conditions scored sub-optimally at this site on the Teton River. Field notes reported that flow was negligible. The channel was less sinuous than expected. Instream habitat parameters were mostly judged optimal, but substrate suitable for colonization was perceived to be somewhat limited. Streambanks were moderately stable, and the riparian zone was abbreviated on one side of the channel.

Table 1. Stream and riparian habitat assessment for a fixed station on the Teton River, July, 2000.

Max. possible score	Parameter	Teton River near Loma
20	Bottom substrate	14
20	Pool substrate char.	17
20	Pool variability	18
20	Channel alteration	19
20	Sediment deposition	17
20	Channel sinuosity	8
20	Channel flow status	0
20	Bank vegetation	9 / 9
20	Bank stability	6 / 8
20	Vegetated zone	9 / 4
200	Total	138
	Percent of maximum CONDITION*	69 SUB-OPTIMAL

*Condition categories: Optimal (OPT) > 80% of maximum score; Sub-optimal (SUB) : 75 - 56%; Marginal (MARG) 49 - 29%; Poor <23%. Adapted from Plafkin et al. 1998.

Table 2. Metric values, scores, and bioassessment for a fixed station on the Teton River. The Montana DEQ bioassessment metric battery recommended for streams of the Plains ecoregions (Bukantis 1998) was used for the evaluation. July 2001.

METRICS	Teton River near Loma	
	METRIC VALUES	METRIC SCORES
Taxa richness	33	3
EPT richness	8	2
Biotic index	6.10	1
% Dominant taxon	32.9	2
% Collectors	51.6	3
% EPT	14.9	1
Shannon diversity	3.15	3
% Scrapers and Shredders	15.6	2
Predator taxa	8	3
% Multivoltine	36.4	3
	TOTAL SCORE (max.=30)	23
	PERCENT OF MAX.	77
	Impairment classification	SLIGHT
	USE SUPPORT	FULL

Bioassessment results are given in Table 2. When this bioassessment method is applied to these data, scores indicate that this site on the Teton River is slightly impaired but fully supports designated uses.

Although the biotic index value (6.10) was high compared to expectations for streams of the Plains Ecoregions, the presence of 7 mayfly taxa suggest that water quality at this site was good. Water temperature measured at the time of sampling was 29.6°C, a figure more than 10°C higher than the mean temperature of the Plains Ecoregions sites visited for the fixed stations study. Many of the taxa collected at the site, such as the mayflies *Caenis latipennis*, *Hexagenia limbata*, and *Choroterpes* sp., prefer warm water. The dominance of taxa associated with warm temperatures likely account for the high biotic index value.

The presence of several hemoglobin-bearing midges, including *Chironomus* sp., *Dicrotendipes* sp., and others suggest that anoxic conditions were present in the sediments at this site. Ample soft sediment habitats were likely available, since these midges, along with the burrowing mayfly *Hexagenia limbata*, require these niches. Habitat complexity was probably enhanced by the presence of macrophytes, since *Caenis latipennis* and the corixids are typically oriented to aquatic plants. The rich fauna (33 taxa) and the abundance of predators (31 animals in 8 taxa) suggest that habitats were diverse and plentiful. All expected functional components of a healthy riverine system were present in the sample.

CONCLUSIONS

- Warm water temperatures exert a great deal of influence over the taxonomic composition of the benthic fauna. In other ways, water quality is probably good at this site.
- High taxa richness suggests good habitat complexity and availability.

LITERATURE CITED

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft, April 22, 1997. Montana Department of Environmental Quality, Planning Prevention and Assistance Division. Helena, Montana.

Woods, A.J., Omernik, J. M. Nesser, J.A., Shelden, J., and Azevedo, S. H. 1999. Ecoregions of Montana (Color poster with map, descriptive text, summary tables, and photographs) Reston, Virginia. US Geological Survey.

APPENDIX

Taxonomic data and summaries

Teton River

August 2001

Aquatic Invertebrate Taxonomic Data

Site Name: Teton River near Loma

Date: 7/09/01

Site ID: M18TETOR01

Approx. percent of sample used: 100

Taxon	Quantity	Percent	HBI	FFG
<i>Prostoma</i> sp.	5	1.73		PR
Nematoda	1	0.35	11	PA
<i>Nais variabilis</i>	13	4.50	10	CG
<i>Limnodrilus hoffmeisteri</i>	5	1.73	10	CG
Physidae	35	12.11	8	SC
<i>Pacifasticus lemusculus</i>	1	0.35	6	SH
Total Misc. Taxa	60	20.76		
<i>Aeshna</i> sp.	1	0.35	5	PR
Total Odonata	1	0.35		
<i>Acentrella turbida</i>	1	0.35	4	CG
<i>Centroptilum</i> sp.	2	0.69	2	CG
<i>Caenis latipennis</i>	1	0.35	7	CG
<i>Hexagenia limbata</i>	2	0.69	6	CG
<i>Leucrocuta</i> sp.	8	2.77	4	SC
<i>Choroterpes</i> sp.	15	5.19	2	CG
<i>Tricorythodes minutus</i>	3	1.04	4	CG
Total Ephemeroptera	32	11.07		
Corixidae - immature	10	3.46	10	UN
<i>Sigara decoratella</i>	10	3.46	5	PH
<i>Sigara grossolineata</i>	28	9.69	5	PH
Total Hemiptera	48	16.61		
<i>Hydroptila</i> sp.	11	3.81	6	PH
Total Trichoptera	11	3.81		
<i>Laccophilus</i> sp.	2	0.69	5	PR
<i>Ordobrevia</i> sp.	1	0.35	5	CG
<i>Halplus</i> sp.	1	0.35	5	PH
<i>Helophorus</i> sp.	1	0.35	5	SH
<i>Berosus</i> sp.	4	1.38	5	PR
<i>Lacobius</i>	1	0.35	5	PR
Total Coleoptera	10	3.46		
Ceratopogoninae	2	0.69	6	PR
Total Diptera	2	0.69		
<i>Ablabesmyia</i> sp.	8	2.77	8	CG
<i>Chironomus</i> sp.	1	0.35	10	CG
<i>Cryptochironomus</i> sp.	2	0.69	8	PR
<i>Dicrotendipes</i> sp.	1	0.35	8	CG
<i>Microtendipes</i> sp.	1	0.35	6	CF
<i>Paratanytarsus</i> sp.	3	1.04	6	UN
<i>Tanytarsus</i> sp.	95	32.87	6	CF
Thienemannimyia Gr.	14	4.84	5	PR
Total Chironomidae	125	43.25		
Grand Total	289	100.00		

Aquatic Invertebrate Summary

Site Name: Teton River near Loma

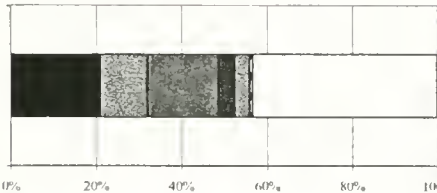
Date: 7/09/01

SAMPLE TOTAL 289

EPT abundance	43
TAXA RICHNESS	33
Number EPT taxa	8
Percent EPT	14.88

TAXONOMIC COMPOSITION

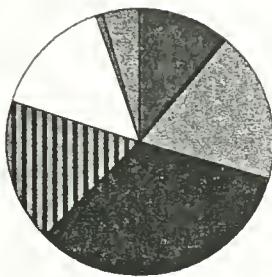
GROUP	PERCENT	#TAXA	ABUNDANCE
Misc. Taxa	20.76	6	60
Odonata	0.35	1	1
Ephemeroptera	11.07	7	32
Plecoptera	0.00	0	0
Hemiptera	16.61	3	48
Megaloptera	0.00	0	0
Trichoptera	3.81	1	11
Lepidoptera	0.00	0	0
Coleoptera	3.46	6	10
Diptera	0.69	1	2
Chironomidae	43.25	8	125



- Misc. Taxa
- Odonata
- Ephemeroptera
- Plecoptera
- Hemiptera
- Megaloptera
- Trichoptera
- Lepidoptera
- Coleoptera
- Diptera
- Chironomidae

FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA	ABUNDANCE
Predator	10.73	8	31
Parasite	0.35	1	1
Gatherer	18.34	12	53
Filterer	33.22	2	96
Herbivore	0.00	0	0
Piercer	17.30	4	50
Scraper	14.88	2	43
Shredder	0.69	2	2
Xylophage	0.00	0	0
Omnivore	0.00	0	0
Unknown	4.50	2	13



- Predator
- Parasite
- Gatherer
- Filterer
- Herbivore
- Piercer
- Scraper
- Shredder
- Xylophage
- Omnivore
- Unknown

COMMUNITY TOLERANCES

Sediment tolerant taxa	3
Percent sediment tolerant	14.88
Sediment sensitive taxa	0
Percent sediment sensitive	0.00
Metals tolerance index (McGuire)	3.19
Cold stenotherm taxa	0
Percent cold stenotherms	0.00

Site ID: M18TETOR01

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Tanytarsus sp	95	32.87
Physidae	35	12.11
Sigara grossolincata	28	9.69
Choroterpes sp	15	5.19
Thienemannimyia Gr	14	4.84
SUBTOTAL 5 DOMINANTS	187	64.71
Nais variabilis	13	4.50
Hydroptila sp	11	3.81
Corixidae - immature	10	3.46
Sigara decoratella	10	3.46
Leucrocuta sp	8	2.77
TOTAL DOMINANTS	239	82.70

SAPROBITY

Hilsenhoff Biotic Index	6.10
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DIVERSITY

Shannon H (loge)	2.19
Shannon H (log2)	3.15

Simpson D

0.12

VOLTINISM

TYPE	ABUNDANCE	PERCENT
Multivoltine	105	36.42
Univoltine	166	57.35
Semivoltine	13	4.50

TAXA CHARACTERS

	#TAXA	ABUNDANCE	PERCENT
Tolerant	12	78	26.99
Intolerant	0	0	0.00
Clinger	4	115	39.79

BIOASSESSMENT INDICES

METRIC	VALUE	SCORE
Taxa richness	33	3
E richness	7	3
P richness	0	1
T richness	1	1
Long-lived	6	5
Sensitive richness	0	1
%tolerant	26.99	3
%predators	10.73	3
Clinger richness	4	1
%dominance (3)	54.67	3
TOTAL SCORE		24

48 %

MONTANA DEQ METRICS (Bukantus 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	33	3	3	3
EPT richness	8	2	0	0
Biotic Index	6.10	1	0	0
%Dominant taxon	32.87	2	2	2
%Collectors	51.56	3	3	3
%EPT	14.88	1	0	0
Shannon Diversity	3.15	3		
%Scrapers + Shredd	15.57	2	1	0
Predator taxa	8	3		
%Multivoltine	36.42	3		
%H of T	0		3	
TOTAL SCORES		23	12	8
PERCENT OF MAXIMUM		76.67	50.00	38.10
IMPAIRMENT CLASS		SLIGHT	MODERATE	MODERATE

Montana DEQ metric batteries

